



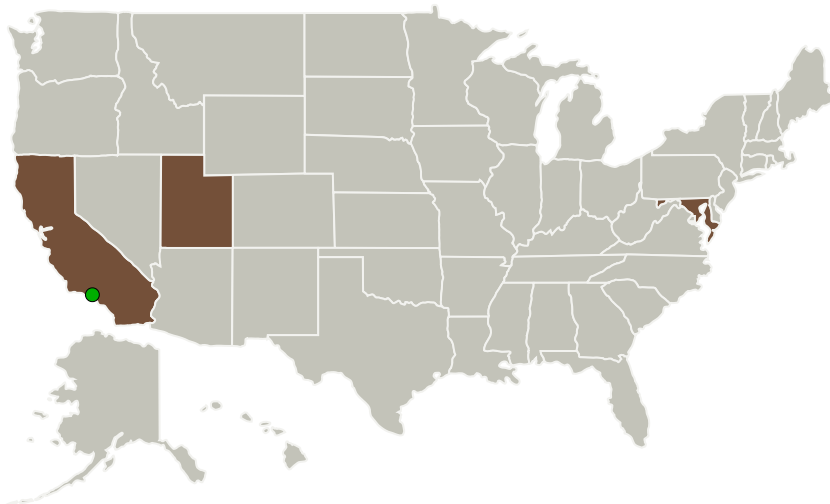
Project Introduction

The Active CryoCubeSat will advance active thermal control methods for CubeSats as well as miniature cryogenic coolers to enable electro-optical detector temperatures in the 75-100K ranges. The first stage of the cooling system will be a mechanical pumped fluid loop (MPFL) thermal control system followed by a pulse tube cryogenic cooler. Additive manufacturing will be used to integrate the MPFL within the CubeSat structure by facilitating embedded conformal coolant channels.

Anticipated Benefits

These thermal systems will enable a new generation of CubeSat missions that can observe the molecular gasses in the upper atmosphere of the Earth and other planets enabling composition, temperature structures, and energy balance to be determined. Specifically the detection of gases with absorption or emission features in the SWIR, MWIR, and LWIR regions (2 - 18 um) will be enabled.

Primary U.S. Work Locations and Key Partners



Active CryoCubeSat

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Utah State University (USU)

Responsible Program:

Small Spacecraft Technology



Organizations Performing Work	Role	Type	Location
Utah State University(USU)	Lead Organization	Academia Alaska Native and Native Hawaiian Serving Institutions (ANNH)	Logan, Utah
California Institute of Technology(CalTech)	Supporting Organization	Academia	Pasadena, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
Lockheed Martin Inc.	Supporting Organization	Industry	Palo Alto, California

Primary U.S. Work Locations

California	Maryland
Utah	

Project Transitions

▶ **November 2015:** Project Start

✓ **October 2018:** Closed out

Closeout Summary: Successful lab test; foundational to 2018 STP Active Thermal Architecture for Cryogenic Optical Instruments

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Christopher E Baker

Program Manager:

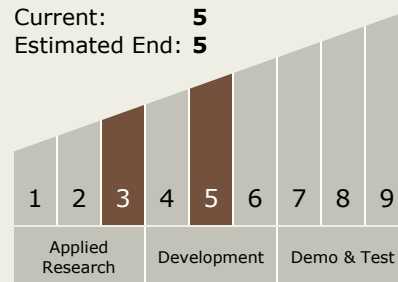
Roger Hunter

Principal Investigator:

Charles Swenson

Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX14 Thermal Management Systems
 - TX14.1 Cryogenic Systems
 - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors

Target Destination

Earth